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ANALYTICAL APPROXIMATIONS

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Analytical Approximation

Chi-Square Integral: To better than .0007 over $0 \leq x \leq 4$ for $m = 6$,

$$F_m(x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^x \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq .01857x^3 - .00516x^4 + .0004451x^5.$$

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Analytical Approximation

Chi-Square Integral: To better than .0006 over $0 \leq x \leq \infty$ for $m = 10$,

$$F_m(m-2+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq 1 - \frac{.6289}{\left[1+.03952x+.00327x^2+.0001208x^3\right]^4} .$$

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11-9-54

Analytical Approximation

Chi-Square Integral: To better than .0006 over $0 \leq x \leq \infty$ for $m = 9$,

$$F_m(m-2+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq 1 - \frac{.6371}{\left[1+.04157x+.003616x^2+.0001279x^3\right]^4} .$$

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Analytical Approximation

Chi-Square Integral: To better than .0007 over $0 \leq x \leq \infty$ for $m = 8$,

$$F_m(m-2+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq 1 - \frac{.6472}{\left[1+.04402x+.004047x^2+.000135x^3\right]^4} .$$

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11-11-54

Analytical Approximation

Chi-Square Integral: To better than .0007 over $0 \leq x \leq \infty$ for $m = 7$,

$$F_m(m-2+x) = \frac{1}{2\Gamma\left(\frac{m}{2}\right)} \int_0^{m-2+x} \left(\frac{t}{2}\right)^{\frac{m}{2}-1} e^{-\frac{t}{2}} dt$$

$$\doteq 1 - \frac{.6600}{\left[1+.04707x+.004591x^2+.0001414x^3\right]^4}.$$

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